10KW Vertical Axis Wind Turbine

User Manual

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Thank you for buying our Vertical Axis Wind Power Generator. Please read the manual carefully before operating the machine. It is not only to ensure the generator in safe and normal operation, but also to bring all the advantages into full play. We hope the vertical axis wind power generator will make you satisfied and happy.

Ⅰ. Overview

Our wind power generating set utilize a new aerofoil vertical axis wind wheel and magnetic suspension structure, choose high strength fiberglass reinforced plastic and epoxy resin to make blades. Our VAWTs are widely used in the areas where there are good wind resources. It can offer the uninterrupted power supply (UPS) for electrical equipments in areas in shortage of electricity. It is applicable for both off-grid system and on-grid system.

Ⅱ. Installation

1. The place of Installation:

The place to be chosen for installation is very important for energy generation and safe operation.

A good place should meet two basic requirements: high average wind speed and weak turbulence.

(ⅰ) The higher the average wind speed, the more power to be generated.

The wind energy is proportional to three cubed of the wind speed. For example, the wind speed of 5m/s can generate nearly twice more electricity than that of 4m/s.

(ⅱ) If the air current is unstable and the turbulence is serious, the possibility of damage of the wind power generator is big. It is bad (not good) for the generator to operate well and safe in a long time (many years). Moreover the turbulence current will affect the wind power generator to reduce the generated energy substantially. The area with high wind speed but serious turbulence is not good for installation.

The tower should be high enough to get higher wind speed, and the air current will be more stable. In a flat area, the height of wind power generator should be above 6 meters.

Trees and some buildings may be the barriers for the air current. Around the barriers, there will be a high, wide, slow-moving and inordinate air current zone. We should avoid installing the VAWT in such areas.

Please refer to the follow data:

(ⅰ) The height of tower should be at least 6 meters higher than the highest barriers and kept 150 meters away.

(ⅱ) If we have to install the wind power generator near the barrier, the height of tower at least twice than height of barrier ,while the height of tower should be less than 12 meters.

2. Directions on Foundation Construction:

If the foundation is hard rock, the ground should be leveled off.

If the foundation is soft rock, 2×2 square meters, the ground should be tamped in order to avoid the foundation sinking.

If the foundation is the soft bed, dig a hole (1.5×1.5m) and 2m in depth, and on the

bottom, put clay 300mm in thickness and then tamp.

3. Configuration of Generating System

Please configure the devices into the power generating system according to the specific conditions.

Controller: To make sure the wind power generator to connect with the controller before setting up the tower, then turn off the controller, and make sure the controller in OFF state (put the switch in "**off**" position), after setting up the tower, make sure the controller to connect with the storage battery correctly and then turn on the controller (put the switch in "**on**" position).

Controller/inverter: for the clients who need the alternating current, match 200V (110V) 50Hz (60Hz), an inverter is needed.

Storage battery: the 10KW wind power generator should match with 120AH/12V× 32 battery bank; Make sure the catelectrode (negative electrode of battery) to connect with the earth.

Cable: Choose the wire of right diameter and the distance between the generator set and storage battery, to avoid loss of the electrical energy.

The minimum wire diameter (cable conductor specification):

10000w(mm^2): 10

The distance between the generator set and storage battery(m)＜50 50-100 100-150

4. Routine Maintenance

No daily maintenance on the vertical wind power generator is needed.

But for the whole wind power generating system, we should check and maintain regularly in order to make sure the system can operate well.

(ⅰ) Check the dragline of tower

If it looses, we should taut (strain) them in time, especially in the first three months after setting up the tower and after strong wind.

(ⅱ) Check wire connections

(ⅲ) Check and maintain the storage battery bank regularly

(ⅳ) Before the extreme weather like very strong wind, typhoon or hurricane etc., to protect from any damage, the tower should be laid down.

5. Trouble Shooting

Trouble	Possible Reason	Method
Shake of VAWT	Wire rope is loose; Set bolt of blades is loose; Blade is damaged; Blade is frozen(ice on surface)	Tauten, fasten; Tauten, fasten; Change with a new one Clear the ice
Unusual noise	Fastening piece is loose; Bearing is damaged;	Lay VAWT down, check the fastening piece;

	Friction between parts of VAWT;	Change a new bearing; Check
Rotor speed is lower	Friction of generator rotor; Generator stator winding short-circuit or output short-circuit; The switch of controller is in "off" position	Change a new bearing; Check the short-circuit part and insulate; The switch of controller is in "on" position
Output voltage is lower	The rotor speed is lower; There is short-circuit in stator winding three phase; Short-circuit in controller; Lower output voltage electric transmission line is longer, the diameter of lead(wire) is thin	Check the reason and restart; Check the short-circuit part and insulate; Change a new one; Shorten the transmission line or make the diameter of lead thick, reduce the loss
Generator alternating current circuitry have no current	Generator alternating broken circuit or fuse fusing current; Output line broken circuit	Check the reason, witch on; Check the broken circuit part and switch on
Generator output alternating current is normal but no direct current	Direct current fusing current; Output line broken circuit; The rectifier in controller is damaged(broken)	Change a new one; Check the broken part and switch on; Change a new one
Output capacity of storage battery is not enough	Output voltage of generator is too lower or has no generating electricity; The wiring terminal of storage battery is acid erosion, the electric conduction is not good; Storage battery lose effectiveness	Check; Clearing the connect parts, make sure connection well and fastening, then daub the barrier cream; Change a new one

Ⅲ Introduction of VAWT

1. Material Introduction

(ⅰ) **Wind turbine blades:** we utilize high strength fiberglass reinforced plastic and epoxy resin to make blades. The wind rotors operate stably and quietly. This kind of new aerofoil is elaborately designed by aerodynamic and hydro-mechanical specialists. The start-up wind speed (or cut-in wind speed) is low, and the wind energy coefficient is high.

(ⅱ)Generator: is made up of the superior high strength permanent magnetic

material. The volume is small and weight is light, the generating electricity coefficient is high. The generator specialists use special electromagnetic technology to make the generator which has extremely low start-up drag torque, to make sure the VAWT can start-up in the gentle breeze. The generating electricity coefficient, start-up performance and overspeed overload capacity of generator are in the leading position in this field.

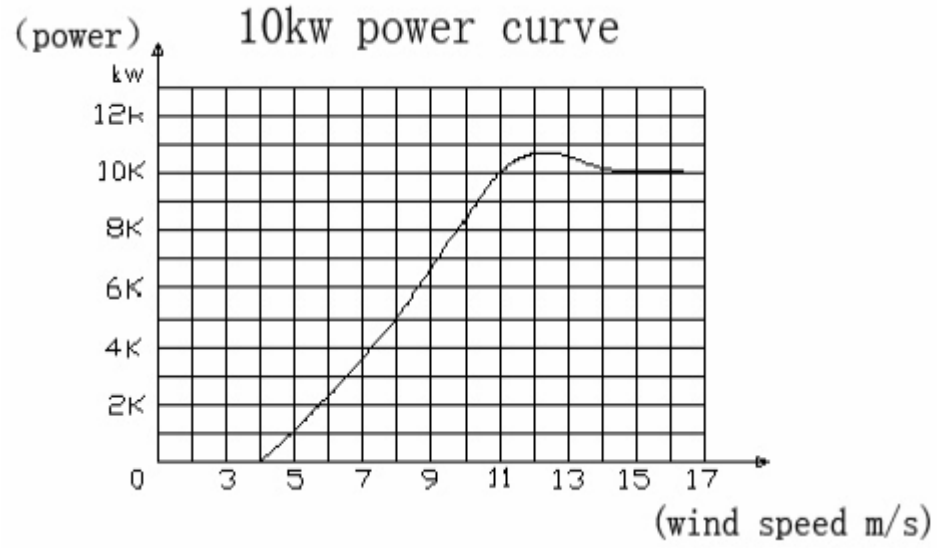
(iii)Whole body: is made up of alloy aluminum precision casting. It can be used in air temperature -30℃-60℃, high humidity, karaburan and salt mist in some extreme weather. It has high reliability, nice appearance, and installation is easy. You can enjoy the clean green energy and beautiful scenery as well.

2. Technical Parameters and Power Curve

(ⅰ) 10KW technical parameters:

Rated power: 10KW
Rotor Diameter: 6m
Height of the Blades: 6.6m
Material of Blades: Glass Fiber Reinforced Plastic
Number of Blades: 5
Rated Rotating Speed: 100r/min
Rated Wind Speed: 13m/s
Start-up Wind Speed: 3.8m/s
Work Wind Speed: 3.8-25m/s
Survival Wind Speed: 50m/s
Output Voltage: AC360V
Overspeed protection: machinery limited speed and electromagnetic brake
Overload protection: electromagnetic brake or unload (unloading device)

(ⅱ) 10000W power curve:



Ⅳ Accessory and Installation Diagram

1. Connection of Tower and Generator

Free standing tower

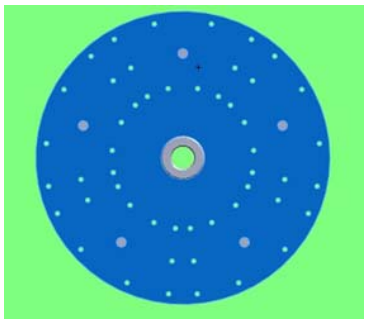
Generator

Joint bolt: M16x65, 6 units

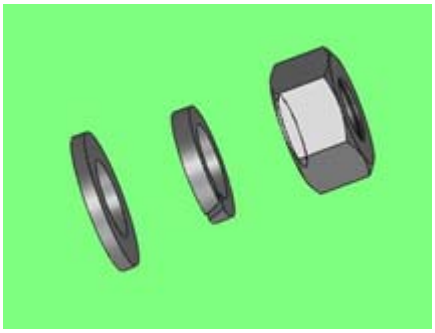
Connection of tower and generator:

2. Installation of Wheel Hub

wheel hub: 1pc



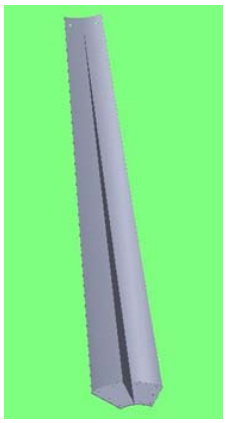
M42 nut, flat gasket, elastic pad: 1pc



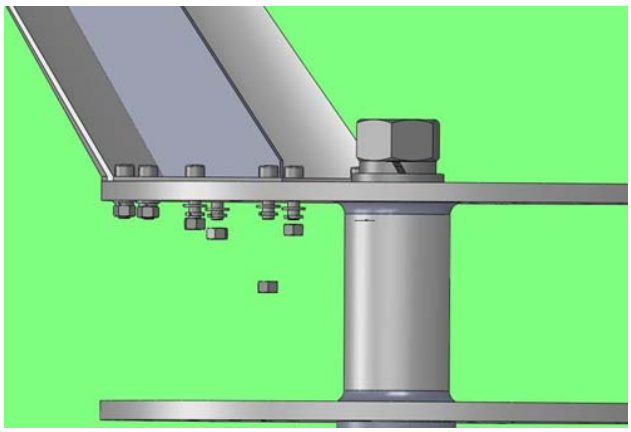
Installation of the hub:

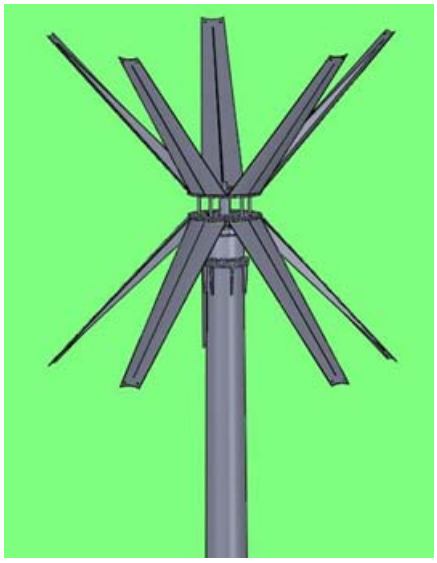
3. Installation of Wings

Wing: 10pcsr



Bolt: M10x35, 120pcs

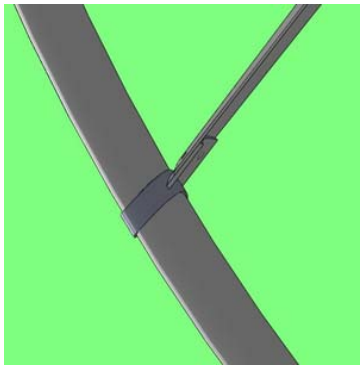


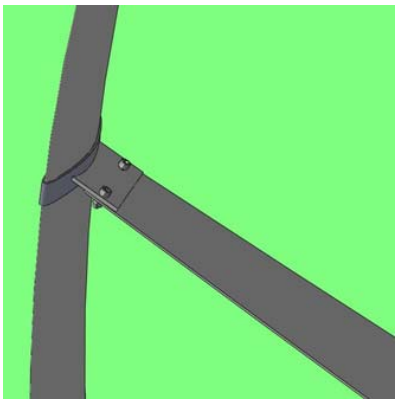


4. Installation of Blades

Blade: 5pcsr

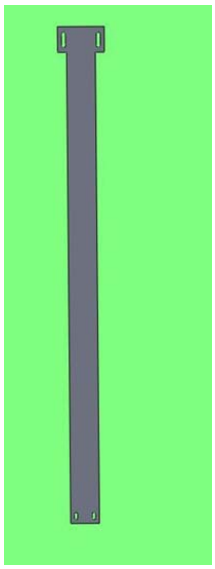
Bolt: M12x30, 20pcs

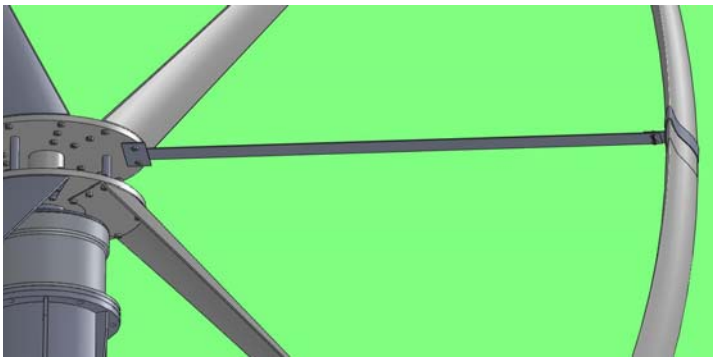


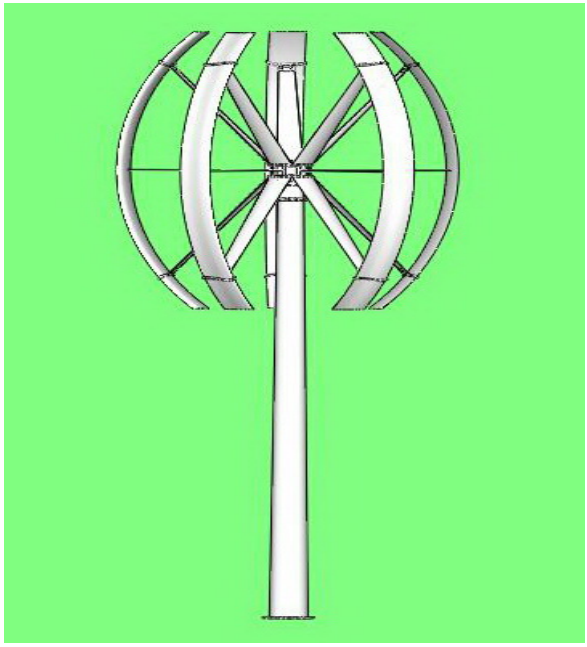


5. Installation of Middle Connection Plate

Middle connecting plate: 5pcs







6. Diagrammatic Sketch